IN THE CLAIMS:

1. (Currently Amended) An infrared optical gas analyzer, comprising:

a cuvette containing the gas mixture to be measured;

a first multispectral detector;

a first infrared optical radiation source positioned such that the radiation emitted in a first wavelength range reaches the first multispectral detector through the interior space of the cuvette, said first wavelength range including absorption wavelengths for a first plurality of gases;

a second multispectral detector;

a second infrared optical radiation source provided such that the radiation emitted in a second wavelength range reaches the second multispectral detector through the interior space of the cuvette, said first wavelength range and said second wavelength range being selected such that they will be different from one another, said second wavelength range including absorption wavelengths for a second plurality of gases, two of said gases in said first and second plurality of gases having a cross sensitivity in said first and second wavelength ranges;

an evaluation unit receiving radiation signals from said first and second detectors to determine concentrations of the first and second group of gases, said evaluation unit using said radiation signals from both said first and second detectors to determine the concentration of the two gases having cross sensitivity.

2. (Canceled)

3. (Canceled)

4. (Original) An infrared optical gas analyzer in accordance with claim 1, wherein the radiation emitted by the first infrared optical radiation source extends at right angles to the radiation emitted by the second infrared optical radiation source and travels over a path of different length.

5 - 10. (Canceled)

11. (Currently Amended) A process for determining gas concentrations <u>of a gas mixture</u> with an infrared optical gas analyzer, the process comprising the steps of:

providing an infrared optical radiation source;

providing a first multispectral detector;

providing a second multispectral detector;

providing a cuvette containing the gas mixture to be measured;

positioning the optical radiation source such that the radiation emitted in a first wavelength range reaches the first multispectral detector through the interior space of the cuvette and radiation emitted in a second wavelength range reaches the second multispectral detector through the interior space of the cuvette;

selecting said first wavelength range and said second wavelength range such that they will be different from one another;

measuring a cross sensitivity to a first group of gases in the gas mixture in the second multispectral detector as a function of a concentration of the first group of gases in order to generate concentration-dependent correction factors;

sending the radiation received by the first multispectral detector in the first wavelength range and sending the radiation received by the second multispectral detector in the second wavelength range as signals to an evaluating and control unit; ~~and~~

calculating at the evaluating and control unit values for the concentrations of a first group of gases contained in the gas mixture from the signals of the radiation in the first wavelength range, which are received by the first multispectral detector; and

calculating at the evaluating and control unit values for the concentrations of a second group of gases contained in the gas mixture from the signals of the radiation in the second wavelength range, which are received by the second multispectral detector, wherein said concentration-dependent correction factors are used for correcting the signals of the radiation in the second wavelength range based on the Bouguer-Lambert-Beer law to compensate any cross sensitivities of the multispectral detector to the first group of gases contained in the gas mixture in the calculation of the concentrations of the second group of gases contained in the gas mixture.

12. (Canceled)

13. (Currently Amended) A process in accordance with claim 11, further comprising

the step of:

using the signals of the radiation in the second wavelength range by the evaluating and control unit for the correction of the radiation in the first wavelength range in order to compensate the cross sensitivities of the first multispectral detector to the second group of gases contained in the gas mixture in the calculation of the concentrations of the first group of gases contained in the gas mixture.

14. (New) A process in accordance with claim 11, wherein:

the first group of gases includes one of the gases carbon dioxide, laughing gas and methane.

15. (New) A process in accordance with claim 11, wherein:

the second group of gases includes one of the gaseous anesthetics desflurane, enflurane, halothane, isoflurane or sevoflurane.

16. (New) A process in accordance with claim 11, wherein:

the first wavelength range is approx. from 3 μm to 5 μm.

17. (New) A process in accordance with claim 11, wherein:

the second wavelength range is approx. from 8 μm to 11 μm.

18. (New) A process in accordance with claim 14, wherein:

the second group of gases includes one of the gaseous anesthetics desflurane, enflurane, halothane, isoflurane or sevoflurane;

the first wavelength range is approx. from 3 μm to 5 μm;

the second wavelength range is approx. from 8 μm to 11 μm.

19. (New) An infrared optical gas analyzer in accordance with claim 1, wherein:

the radiation emitted by the first infrared optical radiation source travels along a first optical path through the interior space of the cuvette;

the radiation emitted by the second infrared optical radiation source travels along a second optical path through the interior space of the cuvette, said first and second optical paths having lengths to cause absorption coefficients of the radiation from said first and second radiation sources to be substantially identical, said lengths of said first and second optical paths being determined as a function of expected concentration ranges of gases to be measured and activation cross sections of the gases.

20. (New) A process for determining gas concentrations of a gas mixture, the process comprising the steps of:

providing a cuvette;

providing an infrared optical radiation source passing first and second wavelength ranges through the cuvette, said first and second wavelength ranges being separate and being

absorbed by first and second groups of gas respectively, two of the gases in said first and second groups of gases having a cross sensitivity in said first and second wavelength ranges;

providing a first detector receiving said first wavelength range downstream of said cuvette, said first detector generating a first signal representing the first wavelength range;

providing a second detector receiving said second wavelength range downstream of said cuvette, said second detector generating a second signal representing the second wavelength range;

passing a know quantity of the first group of gas through the cuvette;

measuring said second signal during said passing of the know quantity of the first group of gas;

calculating a cross sensitivity of the second detector to the first group of gases from said second signal measured during the passing of the known quantity of the first group of gases;

passing the gas mixture through the cuvette;

measuring said first and second signals during said passing of the gas mixture;

calculating concentrations for the first group of gases from said first signal measured during said passing of the gas mixture;

calculating concentrations for the second group of gases from said second signal measured during said passing of the gas mixture, from said cross sensitivity of the second detector and from said calculated concentrations of the first group of gases.

21. (New) A process in accordance with claim 20, wherein:

the gas mixture is from an anesthetic breathing circuit

22. (New) A process in accordance with claim 20, wherein:

the first group of gases includes one of the gases carbon dioxide, laughing gas and methane.

23. (New) A process in accordance with claim 20, wherein:

the second group of gases includes one of the gaseous anesthetics desflurane, enflurane, halothane, isoflurane or sevoflurane.

24. (New) A process in accordance with claim 20, wherein:

the first wavelength range is approx. from 3 μm to 5 μm.

25. (New) A process in accordance with claim 20, wherein:

the second wavelength range is approx. from 8 μm to 11 μm.

26. (New) A process in accordance with claim 20, wherein:

said calculating of said concentrations for the second group of gases is based on the Bouguer-Lambert-Beer law.

27. (New) A process in accordance with claim 21, wherein:

the first group of gases includes one of the gases carbon dioxide, laughing gas and methane;

the second group of gases includes one of the gaseous anesthetics desflurane, enflurane, halothane, isoflurane or sevoflurane;

the first wavelength range is approx. from 3 μm to 5 μm;

the second wavelength range is approx. from 8 μm to 11 μm;

said calculating of said concentrations for the second group of gases is based on the Bouguer-Lambert-Beer law.